

## CLAIMS

1. (amended) A multimedia information generation method for generating multimedia information including a plurality of two-dimensional images and/or three-dimensional images, comprising the steps of:
  - 5 generating, when said multimedia information includes a three-dimensional image, control information corresponding to said image; and
  - 10 generating said multimedia information including said two-dimensional images and/or three-dimensional images and said control information, characterized in that said control information identifies said image as a three dimensional image and controls display of said three-dimensional image.
2. (amended) A multimedia information generation method for generating multimedia information comprised of a plurality of modules, characterized in that
  - 15 said method comprises the step of generating said modules including a plurality of two-dimensional images and/or three-dimensional images, and
  - 20 said modules identifies, when said modules include a three-dimensional image, said image as a three-dimensional image, and include control information for controlling display of said three-dimensional image.
3. The multimedia information generation method according to claim 1 or 2, characterized in that said control information is provided correspondingly to each three-dimensional image.
- 25 4. The multimedia information generation method according to claim 1 or 2, characterized in that said control information is provided correspondingly to a plurality of three-dimensional images.

5. (amended) The multimedia information generation method according to claim 1, characterized in that an identifier for identifying each of at least said three-dimensional images is set in advance, and said control information includes said identifier of the three-dimensional image.

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6. (amended) The multimedia information generation method according to claim 2, characterized in that an identifier for identifying each of at least said three-dimensional images is set in advance, and said control information includes said identifier of the three-dimensional image.

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7. The multimedia information generation method according to claim 5 or 6, characterized in that said control information includes a plurality of identifiers.

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8. The multimedia information generation method according to claim 5 or 6, wherein a predetermined value of said identifier indicates that all of images included in said multimedia information are three-dimensional images.

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9. The multimedia information generation method according to claim 5, wherein a predetermined value of said identifier indicates that all of images included in said modules are three-dimensional images.

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10. A multimedia information reproduction apparatus reproducing multimedia information including a plurality of two-dimensional images or three-dimensional images, characterized in that said apparatus comprises:

a generation unit generating a three-dimensional image from said two-dimensional images; and

a first synthesis unit synthesizing said three-dimensional image generated by said generation unit and the three-dimensional images included in said multimedia

information.

11. The multimedia information reproduction apparatus according to claim 10, characterized in that said apparatus further comprises a second synthesis unit  
5 synthesizing a plurality of two-dimensional images, and

said generation unit generates three-dimensional image data from two-dimensional image data obtained through synthesis by said second synthesis unit.

12. A multimedia information reproduction apparatus reproducing multimedia information including a plurality of two-dimensional images and/or three-dimensional images, comprising:

a page data decoding unit decoding graphic and character information included in said multimedia information to obtain a page image;

15 a 2D/3D conversion unit converting said page image into a three-dimensional image; and

a first synthesis unit synthesizing the three-dimensional image generated by said 2D/3D conversion unit and the three-dimensional images included in said multimedia information.

20 13. The multimedia information reproduction apparatus according to claim 12, characterized in that said apparatus further comprises a second synthesis unit synthesizing a plurality of two-dimensional images, and

said 2D/3D conversion unit converts two-dimensional image data obtained through synthesis by said second synthesis unit into three-dimensional image data.

25 14. The multimedia information reproduction apparatus according to claim 12 or 13, characterized in that a first font image and a second font image corresponding to the character information are provided, said first font image is used when the character

information is three-dimensionally displayed and said second font image is used when the character information is two-dimensionally displayed.

15. The multimedia information reproduction apparatus according to claim 14, 5 characterized in that said page data decoding unit uses said first or second font image to obtain the page image.

16. The multimedia information reproduction apparatus according to claim 14, 10 characterized in that said 2D/3D conversion unit uses said first or second font image to obtain the three-dimensional image.

17. The multimedia information reproduction apparatus according to claim 15 or 16, characterized in that said apparatus further comprises:

15 a font image storage unit storing said first font image and said second font image; and  
a switch selecting said first font image or said second font image.

18. The multimedia information reproduction apparatus according to claim 15 or 16, characterized in that said apparatus further comprises a font conversion unit 20 converting the second font image into the first font image.

19. (amended) The multimedia information reproduction apparatus according to claim 14, characterized in that said first font image is comprised of a plurality of pieces of light/dark information and arranged so that apparent character thickness is thin.

scheme. Therefore, in a conventional three-dimensional display system, data is recorded on the assumption that a display method is initially fixed, without taking into account versatility of the recorded data. For example, if it is decided that a three-dimensional display adapted to the parallax barrier scheme is used, data intended to be shown on that display is recorded on a recording medium. Here, as a possibility of being shown on a display adapted to another scheme is not considered, information that the recorded data is available for the parallax barrier scheme is not recorded on a file.

5 There are various types of information necessary for three-dimensional display, such as the number of viewpoints or a method of thinning, in addition to the display scheme. Such information, however, is not recorded on the file either because the display scheme has been fixed to one. In other words, if the same scheme is always used, such information does not have to be recorded. On the other hand, this fact remarkably impairs versatility of the recorded data. For example, as far as data adapted to the parallax barrier scheme (or the lenticular scheme) is recorded, the image for left eye and the image for right eye can be recorded as separate sequences, or alternatively, a mixed image in which the image for left eye and the image for right eye are arranged side by side so as to each occupy half an area of the screen as shown in Fig. 43C can be recorded. Alternatively, a combined image in which a pair of the image for left eye and the image for right eye are aligned in stripes as shown in Fig. 42B can be recorded. If a recording format is different, a processing method for subsequent display will naturally be different. It is impossible, however, to know in which format the data has been recorded, from the recorded data. Therefore, when a third party obtains the data, he/she does not know what kind of processing should be adopted for displaying the data.

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#### Disclosure of the Invention

An object of the present invention is to provide a multimedia information generation method with versatility given to image data for producing a three-

dimensional display.

Another object of the present invention is to provide a multimedia information reproduction apparatus for reproducing multimedia information with versatility given to image data for producing a three-dimensional display.

5 With the purpose of achieving the above-described object, according to an aspect of the present invention, a multimedia information generation method is a method for generating multimedia information including a plurality of two-dimensional images and/or three-dimensional images. When the multimedia information includes three-dimensional image data, the multimedia information includes control information for 10 controlling display of the three-dimensional images.

According to another aspect of the present invention, a multimedia information generation method is a method for generating multimedia information comprised of a plurality of modules including a plurality of two-dimensional images and/or three-dimensional images. When the modules include three-dimensional image data, the 15 modules include control information for controlling display of the three-dimensional images.

Preferably, the control information is provided correspondingly to each three-dimensional image.

Preferably, the control information is provided correspondingly to a plurality of 20 three-dimensional images.

Preferably, an identifier for identifying each of at least the two-dimensional images and/or the three-dimensional images is set in advance, and the control information includes identification information indicating the identifier of the three-dimensional image.

25 Preferably, an identifier for identifying each of at least the two-dimensional images and/or the three-dimensional images is set in advance, and the control information includes identification information indicating the identifier of the three-dimensional image.

Preferably, the control information includes a plurality of identifiers.

Preferably, a predetermined value of the identifier indicates that all of images included in the multimedia information are three-dimensional images.

Preferably, a predetermined value of the identifier indicates that all of images included in the modules are three-dimensional images.

According to the present invention, even when one multimedia information file includes a plurality of pieces of two-dimensional image data and three-dimensional image data, this one type of multimedia information file can address flexibly to various three-dimensional display schemes since three-dimensional image display control information for displaying the three-dimensional image data is recorded or structured as the multimedia information file together with the three-dimensional image data so that the three-dimensional image data is given versatility.

According to still another aspect of the present invention, a multimedia information reproduction apparatus reproducing multimedia information including a plurality of two-dimensional images or three-dimensional images includes a generation unit generating a three-dimensional image from the two-dimensional images, and a first synthesis unit synthesizing the three-dimensional image generated by the generation unit and the three-dimensional images included in the multimedia information.

Preferably, the multimedia information reproduction apparatus further includes a second synthesis unit synthesizing a plurality of two-dimensional images, and the generation unit generates three-dimensional image data from two-dimensional image data obtained through synthesis by the second synthesis unit.

According to the present invention, even when one multimedia information file includes a plurality of pieces of two-dimensional image data and three-dimensional image data, three-dimensional image display control information included in the multimedia information file can be analyzed to appropriately convert the three-dimensional image data and the two-dimensional image data according to a display method and thereby correctly display them.

Further, with the purpose of achieving the above-described object, according to a further aspect of the present invention, a multimedia information reproduction apparatus reproducing multimedia information including a plurality of two-dimensional images and/or three-dimensional images includes a page data decoding unit decoding graphic and character information included in the multimedia information to obtain a page image, a 2D/3D conversion unit converting the page image into a three-dimensional image, and a first synthesis unit synthesizing the three-dimensional image generated by the 2D/3D conversion unit and the three-dimensional images included in the multimedia information.

10 Preferably, the apparatus further includes a second synthesis unit synthesizing a plurality of two-dimensional images, and the 2D/3D conversion unit converts two-dimensional image data obtained through synthesis by the second synthesis unit into three-dimensional image data.

15 Preferably, a first font image and a second font image corresponding to the character information are provided, the first font image is used when the character information is three-dimensionally displayed and the second font image is used when the character information is two-dimensionally displayed.

Preferably, the page data decoding unit uses the first or second font image to obtain the page image.

20 Preferably, the 2D/3D conversion unit uses the first or second font image to obtain the three-dimensional image.

Preferably, the apparatus further includes a font image storage unit storing the first font image and the second font image and a switch selecting the first font image or the second font image.

25 Preferably, the apparatus further includes a font conversion unit converting the second font image into the first font image.

Preferably, the first font image is comprised of a plurality of pieces of light/dark information and arranged so that apparent character thickness is thin.